**Designing E-Learning Games for Rural Children in India: A Format for Balancing Learning with Fun**“Most important, a large-scale evaluation by Pratham1 showed significant gains on mathematics test scores from playing computer games that target math learning [4]. It is plausible that similar learning outcomes can be replicated using mobile games that target ESL. We also believe many of our lessons will transfer to other languages.” 🡪 waarom games misschien goed kunnen zijn voor educatie (hier staat alleen het bewijs voor wiskunde)  
  
“A longstanding issue is the tension between learning and fun, and the challenge that designers face in balancing both of these (often conflicting) concerns when designing e-learning games.”  
  
“More troubling, in the receptive phase, players did not appear to understand that the animations of the animals crossing the road were meant to teach them vocabulary, and that they should paying attention to the audio recordings. Alternatively, the learners might have known about the vocabulary building objective but chose to focus their attention on watching the animated creatures crossing the road instead of listening to the audio playback.”   
  
🡪 game kan afleiden waardoor kinderen niet meer gefocust zijn op het leren, daarom minimal! Juist leren scheiden van plezier werkt beter zeggen ze in de paper 🡪 kan ik eigenlijk niet gebruiken want het is soort van geintegreerd.

**Spacing One’s Study: Evidence for a Metacognitive Control Strategy**🡪 misschien kun je deze paper gebruiken als een uitleg waarom je foute vragen niet direct herhaald? 🡪 word pair synonyms that have to be studied, option to study immediately, later or not to study. 🡪 most people chose to study later. (after all pairs where done)  
  
**The Spacing Effect: Consolidation or Differential Encoding? :** The rehearsalbuffer theory proposed by Atkinson, the trace-consolidation theory proposed by Landauer, and the multitrace strength theory proposed by Wickelgren (1970) are all examples of the consolidation class. (3 theorieen, misschien opzoeken).  
  
”There is evidence from a variety of paradigms that the spacing of repetitions of an item has large and relatively clear effects on both latency and frequency measures of performance (for a review, see Bjork, 1970). Of these effects, the largest and most general is that recall tends to improve with the spacing of repetitions of an item”  
  
🡪 Als je een vraag herhaalt na makkelijke tussen poze (bij mij dus eigenlijk makkelijke vragen) dan gaat het beter dan wanneer er tussendoor nog moeilijke vragen komen, ook al is er meer tijd tusen de vragen.

**Motivating Children to Learn Effectively: Exploring the Value of Intrinsic Integration in Educational Games**Bewijs dat intrinsic approach beter helpt bij het spel 🡪 dus zoals ik het nu heb, dat intrinsic integration between game and learning content 🡪 dus het leren heeft invloed op je spel   
  
“Three variations of this game were created for evaluation: an intrinsic version that integrated mathematics into combat, an extrinsic version that had non-mathematical combat and placed identical mathematical multiple-choice questions between levels instead, and a control version that contained no mathematics at all.”  
  
“The inclusion of challenge in this taxonomy is derived from the work of Csikszentmihalyi (1988) into flow theory and optimal experience. This proposes that clear goals, achievable challenges, and accurate feedback are all required to achieve a state of flow in an activity that requires “a balance between the challenges perceived in a given situation and the skills a person brings to it,””  
  
“Unfortunately, edutainment products have traditionally taken a “chocolate-covered broccoli” (Bruckman, 1999) approach when combining learning content with gameplay. This is where the gaming element of the product is used as a separate reward or sugar coating for completing the educational content.”   
🡪 *heb ik dat niet nu? Want je krijgt meer salaris als je de vraag goed oplost, maar aan de andere kant is het educatieve deel juist je challenge.*

*“*Consequently, we consider the term intrinsic integration to be a more appropriate way of describing a situation in which “a designer integrates the subject matter with the game idea””  
🡪 *part that is most fun to play, misschien kan ik wel zeggen dat dat bij mij het molecuul maken wel is, want dat is namelijk je uitdaging?*   
  
**Four Principles of Memory Improvement:** A Guide to Improving Learning Efficiency 🡪 process material actively, practice retrieval (repetitions), use distributed learning, metamemory 🡪 process material actively, practice retrieval, bewijs dat dat helpt.  
Players moeten het molecuul zelf maken (actief) en niet alleen bekijken (passief) wat ze in een schoolbook misschien doen.  
  
“Yet research indicates that even an unsuccessful retrieval attempt, if it is followed by feedback, can be more effective than an opportunity to study information without being tested”   
🡪 feedback is dus goed, ook al doet de persoon het fout.   
Thus, in this case, people chose to self-test for a good reason, but not because they realized that self-testing is itself effective for learning. 🡪 dit geeft opzich ook aan dat immediate feedback goed is.  
  
Distributed learning 🡪 spacing effect (in mijn geval kan ik daar alleen rekening mee houden door het herhalen niet direct te doen maar na een aantal vragen.  
  
Metamemory 🡪 kunnen zien hoe goed je bent. In mijn geval kun je dat zien aan dat je vragen fout doet, maar je kunt nog niet zien hoe ver je eigenlijk zou moeten zijn. Misschien een bar maken die aangeeft hoeveel geld je had kunnen hebben? Die dan wellicht grijs is? (weet niet hoeveel werk dat is. Of aangeven hoeveel vragen je nog moet? Aan de andere kant heb ik dit wel in mijn spel, je kunt namelijk direct zien aan je vraag of je het fout had of niet, e nook aan de bar kun je zien dat het niet heel veel omhoog of omlaag gaat. Belangrijk om eerst de makkelijke goed te kennen en eerst te doen omdat je die dan makkelijker onthoudt dan de moeilijke. Als je eerst de moeilijke doet dan onthoud je wellicht niks meer 🡪 ook een soort bewijs voor het van makkelijk naar moeilijk doen van het adaptive algorithme.   
  
“In support of the proximal learning model, participants focused on the easier items first, studying them in advance of the more difficult items. However, participants shifted their focus from the easy items to the difficult items and studied the latter more often. “ 🡪 dit betekent misschien ook dat ik moeilijke vragen die heel erg fout zijn gedaan misschien vaker moet herhalen, dan makkelijke vragen die heel erg fout zijn gedaan… In principe gebeurt dit al, want makkelijke vragen krijg je eerder goed en zul je dus minder vaak herhalen dan de moeilijke.   
  
Dus ik houd me in principe wel aan de four principles! In je introductie beschrijven wat ze zijn en later vertellen hoe je die hebt geimplementeerd.   
  
**Four Pillars  
  
Active Learning**“When it comes to apps, we need to draw a distinction between being physically active and mentally active, because access to every app demands at least some physical activity. To qualify as active in our pillar, children cannot simply tap or swipe, but rather must be minds-on. We use the term “minds-on” to distinguish between physical activities that can be done with relatively little mental effort and those activities that require thinking and intellectual manipulation. Tapping in a response to something on a screen to make it rise is “minds-off,” but activities such as purposefully figuring out where a puzzle piece goes or learning about abstract concepts such as cardinality or addition are minds-on”  
Game is like a puzzle, need to find out how all connections should be and so on 🡪 minds on!  
  
“When adults generate an incorrect response and are then given feedback, they show better retention than if they either were provided with or chose a correct answer (Potts & Shanks, 2014)”  
 **Engagement**-behavioral engagement (i.e., rule-following, effort, persistence, participation in programs),   
-emotional engagement (i.e., affective reactions),   
-cognitive engagement (i.e., investment in learning, flexibility in problem solving)

Contingent interactions 🡪 touchscreen immediate response.  
Extrinsic motivation and feedback 🡪 duidelijke feedback  
  
“With this research in mind, the praise offered through apps should be mindful of praising children for their effort rather than for their intelligence. The former can cultivate a growth mind-set, motivating children to tackle and stay engaged in difficult tasks.”

**Meaningful learning  
“**and linking new learning to preexisting knowledge” 🡪 Fluor, chloor en methaan leren en daarna difluordichloridemethane ofzoiets. Dan leer je door middle van oudere weer nieuwe. Het leuk maken 🡪 dus het verhaal eromheen.  
  
“apps that require children to solve problems or demonstrate proficiency in a content area in the service of a larger game narrative may be more successful than apps in which challenges are not integrated into the game’s narrative or context”.  
  
“There is no denying that apps can teach children isolated facts, but meaningful interactions with the content that link to children’s lives will lead to greater retention and spur conceptual change” 🡪 daarom het verhaal.

**Social interaction**  
🡪 lasting in te bouwen, je zou kunnen zeggen dat je verhaallijn hier dus weer mee te maken heeft, nog beter dit stukje lezen.  
  
Adaptive learning algorithm 🡪 assistant which improves social interaction. Feedback which improves social interaction (not really conversation)

**% "Meaningful learning takes many forms, including learning with a purpose, learning new material that is personally relevant, and linking new learning to preexisting knowledge"**

**% The widely cited scholar David Ausubel (1968) theorized that true learning occurs when we make connections between new material and related content we already know. --> ook belangrijk voor adaptive algorithm daarom ook deze volgorde.**

**% context about the challenge/learning you have to do**

**% Learning meaningful information motivates children to stay engaged and on task.**

**% For example, children were more likely to continue with placing pegs in a board if they were prompted with a picture of a novel object and given new, meaningful information about that object. These children were more likely to continue with the boring task than children who received less rich information or even tangible rewards**

**% Hudson and Nelson (1983) found that children 4 to 7 years of age are likely Putting Education in “Educational” Apps 15**

**%to remember more story events when the narrative they are hearing is familiar (e.g., about a birthday party) versus unfamiliar (e.g., about baking cookies).**

**% rote learning, new information that does not fit into an existing framework, that does not link to existing knowledge.**

Thesis  
  
In **introductie** beschrijven dat je je gefocust hebt op immediate feedback, want …  
op spacing effect want… op, en alle aspecten waar je je nu op richt.  
  
Papers to use:  
  
Find a paper about the repetition, when should you use repetition for learning? (hoe vaak en hoe snel?)  
Is immediate feedback beter  
  
Misschien een paper zoeken over kleuren?

**%M. P. Jacob Habgood \& Shaaron E. Ainsworth describe the definition of intrinsic motivation as such: " It is commonly surmised that a person is intrinsically motivated to perform an activity when he or she receives no apparent rewards except the activity itself \cite{habgood2011motivating}."**

**%Although they also say that video games could have some external rewards and still be intrinsically motivated.**